

Looking Back and Looking Ahead

Unit Review

While working on the problems in this unit, you extended your skill in writing equations to express linear relationships. You also learned about a type of nonlinear relationship called an inverse variation. You used inverse and linear relationships to solve problems and make predictions.

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For: Vocabulary Review
Puzzle

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Use Your Understanding: Linear and Inverse Variation

Test your understanding of linear relationships and inverse variations by solving the following problems about a recreation area that has a playground, hiking trails, amusement rides, and a small farm.

1. This table shows the growth of one pig that was raised on the farm.

Average Growth of Properly-Fed Pig

Age (mo)	0	1	2	3	4	5	6
Weight (lb)	3	48	92	137	182	228	273

SOURCE: Your 4-H Market Hog Project, Iowa State University.

- a. Make a graph of the (*age, weight*) data. Draw a line that seems to fit the data pattern.
- b. Find a linear equation in the form $y = mx + b$ for your line from part (a).
- c. What do the values of m and b in your equation tell you about the growth of the pig?
- d. Use your equation to estimate the pig's weight at 3.5 months and at 7 months.

2. One group of students suspects that farm animals eat less when the weather is warmer. They ask the farm staff to keep a record of what an adult goat eats on days with different average temperatures.

Food Consumption for a Goat

Average Daily Temperature (°F)	30	40	45	55	60	75	85	90
Food Eaten (kg)	3.9	3.6	3.4	3.0	2.7	2.5	2.2	1.9

- a. Make a graph of the (*temperature, food eaten*) data. Draw a line that seems to fit the data pattern.
- b. Find a linear equation in the form $y = mx + b$ for your line from part (a).
- c. What do the values of m and b tell you about the relationship between temperature and the goat's food consumption?
- d. Use your equation to predict how much the goat would eat on a day with an average temperature of 50°F. On a day with an average temperature of 70°F.
3. A small train gives visitors rides around the park on a 5,000-meter track. The time the trip takes varies. When many people are waiting in line, the drivers go quickly. When there are fewer people waiting, they go more slowly.
- a. Sketch a graph showing how the average speed (in meters per minute) changes as the trip time (in minutes) increases.
- b. For what parts of your graph are the predicted speeds realistic? Explain.
- c. Write an equation relating the average speed s to the trip time t .
- d. Write several sentences explaining as accurately as possible how average speed changes as trip time changes. In particular, describe the type of variation involved in this relationship.

